

XII.—NEW ENGLAND LYCOSIDÆ. BY J. H. EMERTON.

THE Lycosidæ have the abdomen and usually the cephalothorax considerably longer than broad and the legs long, the fourth pair longest, with long movable spines. The feet have three claws, the lateral ones long with numerous teeth, and the middle one short without teeth or with only one or two. The tarsi are sometimes thickly covered with hairs concealing the claws, but there are no toothed hairs under the claws as in the spiders that live in webs.

The eyes are in three rows. The front row consists of four small eyes nearly of the same size, the second row of two large eyes on the front of the head and the third row of two eyes a little smaller than the last, a little farther apart and farther back on the head.

The body is hairy all over and a large part of the markings are formed by colored hairs and change considerably when the spider is wet. The markings consist usually of three longitudinal light lines on the cephalothorax, different parts of which are obscured in different species, and a middle stripe of various shapes on the abdomen.

The palpi of the males are comparatively simple. The patella and tibia are but little modified except in *Dolomedes*. The tarsus is long and pointed. The tube of the palpal organ is usually short and lies across the middle of the bulb. On the middle or base of the bulb is a large process, the shape of which distinguishes many species. The external part of the epigynum consists usually of a middle lobe widened at the end and hard side lobes.

The Lycosidæ live on the ground, running after their prey and making no cobwebs. Several species make holes in the ground, which they line with silk and use for shelter but not as traps.

The females carry the cocoon attached to the spinnerets and the young mount on the female's abdomen and are carried for a time after leaving the cocoon.

Dolomedes and *Ocyale* carry the cocoon in their jaws and spin a large irregular web in bushes for the use of the young.

Many of the species of Lycosidæ are very difficult to distinguish, and I have been unable to identify many of them with published descriptions. I have compared mine with a large collection of European Lycosidæ and find very few species common to both countries. The following papers contain descriptions of American Lycosidæ.

E. Keyserling. *Amerianische Citigradæ* in *Verhandlungen der zool. botan. Gesellsch.*, Wien, 1876.

Geo. Marx. *American Naturalist*, vol. xv, May, 1881. On some new tube-constructing spiders.

S. H. Scudder. *Psyche*. Vol. ii, page 2, 1877. *Lycosa arenicola*.

T. Thorell. Notice of some spiders from Labrador. *Proc. Boston Soc. Nat. Hist.*, vol. xvii, 1875.

N. M. Hentz. *Araneides of the U. S.* *Boston Journal of Nat. Hist.*, vols. iv and v.

Mary Treat. *Harper's Magazine*, April and May, 1880.

H. C. McCook. Habits of *Lycosa nidifex*, *Proc. Phil. Acad. Nat. Sci.*, June, 1883.

In the classification of this family I have followed the arrangement and names used by Simon in *Arachnides de France*, except that I have included *Oxyopes*, as was done by older writers. The family includes three sub-families, *Lycosinae*, including *Lycosa*, *Pirata*, *Paradosa* and *Aulonia*; *Dolomedinae*, including *Dolomedes* and *Ocyale*; *Oxyopinae*, including *Oxyopes*.

Lycosa Latr.

Tarentula Thorell; Keyserling, *Amerianische Citigradæ*, *zool. botan. Ges.*, Wien, 1876.

Lycosa Simon, including *Trochosa* and *Arctosa* Koch.

This genus includes the largest spiders found in the Northern States, and most of the species are of large size and covered with hair. The legs are stout and thickly covered with hairs on the tarsi. The front row of eyes is nearly straight and as long as the second row or longer, the middle pair usually a little larger than the others. The second eyes are the largest and about their diameter apart. The dorsal eyes are smaller and farther apart. The spinnerets are short, the hinder pair no longer than the anterior. Several species dig deep holes or make shallow nests under stones, where they hide while molting or carrying their young.

Lycosa nidicola, new.

PLATE XLVI, FIGURES 1, 1a, 1b, 1c, 1d.

Large female, 18^{mm} long. Cephalothorax, 9^{mm} long, 7^{mm} wide; 1st leg, 22^{mm}; 4th leg, 28^{mm}.

Color yellowish brown. The cephalothorax has a light middle line, narrow between the eyes and a little wider behind, with a fine dark

line along the dorsal groove. On each side of the thorax, near the edge, is a light line about as wide as the median one. The legs are yellowish brown, without rings, and darker or lighter according to the age of the spider. On the front of the abdomen is a middle stripe, darkest at the edges, which tapers to a point about the middle of the back. On each side of this are light stripes, which unite and become a narrow middle stripe on the hinder part of the abdomen. At the sides of the middle stripe are slightly darker and lighter oblique lines. The under side of the abdomen has irregular dark spots on a light ground, sometimes arranged in oblique lines at the sides and two or three longitudinal lines in the middle. The male is about half as large as the female and similarly marked. The tarsus of the male palpus is long, about twice the length of the palpal organ and has several straight spines at the end. The palpal organ has a large barbed process across the base below the tube; above the tube is a thin sharp process about the same length and at its base a shorter one. The epigynum is about as wide as long and shaped like the letter T.

This is one of the most common species. It is oftenest found under stones where the female makes a hollow in the ground lined thinly with silk in which she stands with her cocoon of eggs early in the summer.

Massachusetts; Providence, R. I.; New Haven and Noank, Conn.; Indianapolis, Indiana.

Lycosa pratensis, new.

PLATE XLVI, FIGURES 4, 4a, 4b.

Length, 10^{mm}. Cephalothorax, 5^{mm} long, 3^{mm} wide.

The colors are dark and light yellowish brown, browner than *L. nidicola*, which species it much resembles. The middle of the cephalothorax is light, broken by faint grayish stripes. Behind the middle the light area narrows and extends back to the end of the thorax. The abdomen is grayish, marked by two rows of light spots, indistinctly connected in pairs by cross lines. When wet the markings appear more complicated, as in the figure. On the front of the abdomen is the usual light stripe with dark edges over the dorsal vessel.

The front row of eyes is hardly longer than the second row, which distinguishes this species from *polita*.

The epigynum is shaped like that of *lineata*, but is shorter and wider. The palpal organ has the processes which support the tube, wider and more curved than in *lineata*.

This is the most common species under stones and under leaves in winter. Eastern Mass.; Mt. Tom, Mass.; New Haven, Conn.; Mt. Washington, N. H.

Lycosa polita, new.

PLATE XLVI, FIGURES 2, 2a, 2b, 2c.

Female, 12^{mm} long. Cephalothorax, 5½^{mm} long, 4^{mm} wide; 1st leg, 11^{mm}; 4th leg, 13^{mm}.

This is a small, short-legged species, like the last. The cephalothorax is reddish brown, dark at the sides and light in the middle, the two colors spreading into each other by several irregular notches around the dorsal groove. The hairs of the cephalothorax are very short and the whole surface looks as if polished. The legs are colored like the cephalothorax but have longer hairs and dark spines. The abdomen is light yellowish, with dark gray or black markings, resembling those of *Tegenaria*. On the front end is a light middle patch partly divided into three, and behind this are five or six herring-bone markings broken by irregular light spots. Under the abdomen is a dark middle line, which widens at the ends around the epigynum and the spinnerets. At the sides of this line and in front the abdomen is yellowish white, except irregular dark gray lines, which extend down the sides from above. The sternum and under sides of the legs are dark like the back of the thorax.

Another variety has dark markings on the cephalothorax and legs. The legs are marked with broken dark rings, two or three on each joint. The head and middle of the thorax are light, with some faint dark spots. On each side of this light area are two irregular dark bands not extending to the edge of the cephalothorax, which is marked by broken spots of light and dark.

The front row of eyes is much wider than the second row.

The epigynum is short and wide and has a peculiar shape characteristic of this species, see fig. 2c.

Eastern Mass.; Albany, N. Y.; New Haven, Conn.; under stones in summer and under leaves in winter. Eggs in June and July.

Lycosa frondicola, new.

PLATE XLVI, FIGURES 3, 3a, 3b.

Female, 14^{mm} long. Cephalothorax, 7^{mm} long, 5^{mm} wide; a little smaller than *lineata*.

The colors are gray and brown, like dead leaves among which it lives. The cephalothorax is dark brown at the sides and has a wide gray stripe in the middle.

The abdomen is similarly marked with a wide gray band in the middle and dark brown at the sides. In the gray band are some faint darker markings and an indistinct middle line in front tapering to a point near the middle of the back. The legs are dark gray. The sternum is dark gray. The under side of the abdomen has a wide dark stripe in the middle with irregular edges.

The epigynum is as wide as long. The middle lobe is very narrow in front and widens suddenly at the end into a shape like the letter T.

Lycosa pictilis, new.

PLATE XLVI, FIGURES 5, 5a, 5b.

13^{mm} long. Cephalothorax, 5.5^{mm} long, 4^{mm} wide.

The cephalothorax is brown at the sides and has a wide middle stripe from between the eyes to the abdomen. Just back of the eyes the stripe widens, forming a square figure with corners pointing toward the sides. The back of the abdomen has in front two orange-colored spots. Following these is a row on each side of white spots surrounded by black, and between them a middle row of light angular markings. The legs are marked with alternate light and dark brown rings. The dark rings do not extend around the under side of the legs.

The epigynum is small. The middle lobe is widened and rounded at the end. The tube of the male palpus is short and partly concealed by the basal process, which extends across the tarsus and curves backward at the end.

This very distinct species is abundant among the moss and low shrubs on the upper part of Mt. Washington, N. H., and the neighboring mountains.

Lycosa kochii Keyserling, Verhandlungen zool. botan. Gesells., Wien, 1877.

PLATE XLVI, FIGURES 6, 6a, 6b, 6c.

Length of female 14^{mm}. Cephalothorax 6^{mm} long, 4.5^{mm} wide. The cephalothorax is dark brown at the sides and light brown or grayish in the middle. The middle of the abdomen is grayish brown with black muscular spots and bordered at the sides with darker brown, which forms two almost black spots on the front corners of the abdomen. The legs are light gray at the base and darker toward the tips. Beneath the color is lighter than on the back.

The colors and markings of the back are nearly the same as those of a smaller and shorter-legged species *L. frondicola*, but it may be easily distinguished by the epigynum, and by the light color of the under side of the body.

A soft and dark-colored specimen, probably lately molted, has the rings on the legs and all the dark markings more distinct and the epigynum smoother and less shrunken than usual, with the front part of the middle lobe nearly straight and with parallel edges not contracted in the middle as in most specimens.

The epigynum is very different from those of the related species. The anterior pit is single and the middle lobe is narrow in front and widened behind into a triangular and thickened end.

The palpal organ has the barbed process across the base of the bulb rather small and black. The tube is long and curved around the end of the hollow of the tarsus. At its base is a hard process extending across the bulb parallel to the barbed appendage. A thin process extends around parallel with the tube to its end.

This species lives in woods running among the dead leaves, which it much resembles in color. It matures in spring and carries its cocoons in May and June.

New Haven, Conn.; Boston, Mass.

Lycosa carolinensis Hentz.

PLATE XLVII, FIGURES 1, 1a, 1b.

A large female is 30^{mm} long. Cephalothorax, 13^{mm} long, 10^{mm} wide; 1st leg, 35^{mm}, 4th leg, 48^{mm}.

The male is more slender. One measures 18^{mm} long. Cephalothorax, 10^{mm} long, 7.5^{mm} wide; 1st leg, 33^{mm}, 4th leg, 37^{mm}.

The whole body and legs are mouse color above, light in males and darker in females. The joints of the legs are darker towards the tips and the spines are black. The abdomen is indistinctly marked above. The markings of the under side are much brighter. The under side of the abdomen, sternum and coxæ are deep black, the femora light mouse color with a black ring at the end. The tibiae are gray in the middle and black at the ends. The mandibles are black with orange hairs on the front. All these markings are much less distinct in the female than male.

The whole body is thickly covered with short hair. The tarsi are very hairy, especially on the under side, covering up the claws except the tips.

Half-grown females in Sept., at New Haven, running in dry pastures, are very brightly marked, nearly black on the back of the abdomen, with the segments distinct.

This species digs a hole six or eight inches deep, but is often found under stones or running in fields and occasionally in houses all over

New England. The eggs are laid in July. The young after leaving the cocoon gather on the abdomen of the female which then looks as large as a mouse.

The palpal organ is small for so large a spider. The tube and the supporting appendage are short and thin. The basal process is short and black, slightly forked at the end. The epigynum resembles that of *pratensis* and *nidifex*.

Lycosa vulpina, new.

PLATE XLVII, FIGURE 2.

A large female measures 23^{mm} long. Cephalothorax, 12^{mm} long, 9^{mm} wide; 1st leg, 31^{mm}; 4th leg, 36^{mm}.

The general color, in alcohol, is dark brown, with light gray or white markings. The colors are all probably lighter in life. The cephalothorax has a narrow light line in the middle, widest behind, and wider and less distinct lines at the sides. The abdomen is indistinctly figured with spots of dark brown on a lighter ground, or the markings run together into a nearly uniform dark brown. The legs are dark with light rings which are wider and more distinct on the inner joints and absent on the tarsi and metatarsi. The sternum, coxae and maxillae are all dark brown. The epigynum is shorter than in *carolinensis* and the end thicker.

This species is about as large as *L. carolinensis* and has a general resemblance to that species. It is easily distinguished by the rings on the legs, the less distinct black markings on the under side, and the shape of the epigynum.

Mt. Tom, Mass.; New Jersey, McCook.

Lycosa nidifex Marx, American Naturalist, May, 1881.

Lycosa arenicola Scudder, Psyche, vol. ii, page 2, 1877.

PLATE XLVII, FIGURES 4, 4a, 4b.

Length of female, 21^{mm}. Cephalothorax, 10^{mm} long, 7^{mm} wide; 1st leg, 22^{mm}; 4th leg, 25^{mm}.

The cephalothorax is dark gray with a wide light band in the middle. The abdomen is light gray with a dark band in the middle, which follows the shape of the dorsal vessel in front and incloses in the hinder half 3 or 4 pairs of white spots. The legs increase in thickness and the color becomes darker from the fourth to the first pair. The first legs are dark brown covered with gray hairs, the hind legs light gray or yellowish with black spines. The first and second legs are black beneath except the tarsi. The sternum is dark

est at the front end. The mandibles are covered with light gray hairs on the front.

Two old females taken at New Haven, Conn., Oct. 4th, had all the colors faded to nearly uniform dark brown, the dark parts lighter and the light parts darker than in younger individuals and the hairs on the legs shorter.

The epigynum is T-shaped, with the cross piece short and thick.

The males are a little smaller than the females. The palpal organs resemble those of *lineata*, but the tube is shorter and the terminal process which supports it is short and thick and tapers to a narrow point.

This species makes holes six inches to a foot deep, lined with silk and with a ring of rubbish fastened together with silk around the mouth. The habits are described by Scudder in *Psyche*, vol. ii, p. 2; George Marx in *Am. Naturalist*, May, 1881; and H. C. McCook in *Proc. Phil. Acad. Nat. Sci.*, June, 1883.

Albany, N. Y.; New Haven, Conn.; Cape Cod, Martha's Vineyard and Nantucket, Mass.; Long Island, usually in sandy fields.

Lycosa cinerea F.

PLATE XLVII, FIGURES 3, 3a, 3b.

Male, 13^{mm} long; 1st leg, 18^{mm}; 4th leg, 23^{mm}; palpi, 8^{mm}.

The cephalothorax is yellowish white with indistinct radiating markings about the dorsal groove. The space between the eyes is black. The legs are whitish with indistinct brownish rings and black spines. The ends of the legs and palpi are darker. The abdomen is white with irregular gray markings. The mandibles are dark brown. The under side of the whole body is yellowish white. The whole body is covered with long white or gray hairs.

The male palpi are long. The tarsus is slender and pointed and twice as long as the palpal organ, which is small and closely folded together.

On sandy fields and beaches, Eastern Massachusetts; Martha's Vineyard; New Haven, Conn.; Indianapolis, Indiana. It has several times been found on beaches where it appeared to have been covered by the tide. It is also a common spider in Europe.

Lycosa nigroventris, new.

PLATE XLVII, FIGURES 5, 5a, 5b.

Length, 12^{mm}. Cephalothorax, 6^{mm}; 4th leg, 20^{mm}. Colors gray and dark brown. In the middle of the cephalothorax is a straight gray

stripe as wide as the eye-area. The edges of the thorax are also light. Between these the sides of the cephalothorax are dark brown, almost black near the edges of the middle stripe.

The abdomen is light gray in the middle. At the sides in front are two dark spots, darkest in front, extending back half the length of the abdomen and between them are two small dark spots near the muscular spots on the first segment. The hinder half of the abdomen is marked by scolloped transverse dark lines. The legs are covered with gray hairs and scattered dark spines.

The sternum is dark brown and the coxæ nearly as dark. In the middle of the under side of the abdomen is a black marking more than half as wide as the body extending from the spiracles to the spinnerets. The front part of the abdomen is brown like the coxæ. The mandibles are dark brown with a few light hairs on the front near the base. The palpi are a little longer than the first femur and light gray, except the tarsus which is a little darker. The palpal organ is moderately large, the tube and its support much longer than in *carolinensis*, but proportionally shorter than in *pratensis*, etc.

Near Chebacco pond, Essex, Mass., Aug., 1877.

Lycosa communis, new.

PLATE XLVII, FIGURES 6, 6a, 6b, 6c, 6d.

Length, 10^{mm}. Cephalothorax, 5^{mm} long, 4^{mm} wide; 1st leg, 14^{mm}; 4th leg, 17^{mm}.

The colors and markings are very variable in this species. The most distinctly marked individuals are very dark brown or black with light gray and yellow markings and dark rings on the legs. The lighter specimens have the legs light gray and all the darker parts of the body of the same color. In the dark variety the cephalothorax is dark brown with a narrow light gray stripe in the middle and on each side. The middle stripe divides into three in front, the middle part extending forward between the eyes to the front of the head, while the side branches end in front of the hinder eyes. The abdomen is dark brown with two bright yellow stripes on the front part that unite into one behind the middle and are indistinctly divided into segments by grayish lines. Along the sides of the yellow lines are several pairs of irregular black spots. The legs are ringed with gray and dark brown. The under side of the abdomen is gray, with a black stripe each side, which unite in front of the spinnerets and sometimes are connected in front by a black transverse line be-

hind the epigynum. The sternum is dark brown with sometimes a light mark in the middle. In some light colored individuals the space between the two yellow bands on the abdomen is much lighter, so that it forms with them a wide yellowish middle stripe. Fig. 6b.

This is a slender species with long legs. The front row of eyes is shorter than the second row and a little curved upward. The eyes of the second row are about their diameter apart. The epigynum is T-shaped. There are two pits near together in front. The anterior part of the epigynum is widened in the middle. The cross-piece is scalloped at the ends. The male palpi are long and slender. The palpal organ has a thick process at the base with a large tooth. The terminal process which seems to support the tube is short and curved upwards at the end. Near its base is a small hook. The tarsus is about twice as long as the palpal organ and not very sharp at the end, where there are several thick spines.

They run in grass in open fields or hide under stones, especially when about to molt or to lay eggs. When surprised in open ground they sometimes lie flat and appear dead.

Eastern Mass.; Providence, R. I.; New Haven, Conn.

Lycosa punctulata Hentz.

PLATE XLVIII, FIGURES 1, 1a, 1b.

The largest female measures 16.5^{mm} long. Cephalothorax, 7.5^{mm} long, 5.5^{mm}; 1st leg, 19^{mm}; 4th leg, 22^{mm}.

The cephalothorax is whitish with two distinct dark brown stripes. The abdomen has a dark brown middle band with a narrow white stripe on each side, beyond which the sides of the abdomen are brownish, darkest towards the front end. The under side of the abdomen is light or with some irregular dark patches and has several black spots irregularly arranged and differing in size and number in different individuals. The legs are without rings but the ends of the joints are darker than the rest. The cephalothorax and abdomen are narrower than in most species.

The epigynum is narrow and convex in the middle, the middle lobe only slightly elevated and a little widened in front. At the hinder end is a short transverse piece.

Woodbridge, Conn.; Sherborn, Mass., from A. L. Babcock; Providence, R. I.; Indianapolis, Indiana. Hentz's specimens were from Pennsylvania and Alabama.

Lycosa scutulata Hentz.

PLATE XLVIII, FIGURES 2, 2a.

Female, 16^{mm} long. Cephalothorax, 7.5^{mm} long, 5.5^{mm} wide; 1st leg, 22^{mm}; 4th leg, 28^{mm}.

This species resembles *punctulata*, but the legs are proportionately longer. The cephalothorax has two dark longitudinal stripes along the middle and finer dark lines near the edges. The abdomen has a dark middle stripe broken by two notches near the front third and including three or four pairs of light spots in the hinder half. The under side is light without markings. The legs are light with the ends of the joints darker.

The epigynum is shorter and wider than in *punctulata* and less convex. The transverse end of the middle lobe is wider.

New Haven, Conn., under stones along roads. A female found Sept. 15th, was in a shallow hole lined with silk, with young on her back.

Lycosa ocreata Hentz, Boston Journal of Nat. Hist., vol. iv.

Probably *Lycosa ocreata* Keyserling, zool. botan. Gesells., Wien, 1876.

PLATE XLVIII, FIGURES 6, 6a, 6b.

Males, 6 to 7^{mm} long; 1st leg, 10 to 12^{mm}. Small female, 8^{mm} long. Cephalothorax, 3.5^{mm}.

The cephalothorax has a light gray stripe in the middle from the second row of eyes backward. At the sides the cephalothorax is dark brown. The abdomen is dark brown at the sides and has a light grayish figure in the middle indistinctly divided into segments on the hinder half. Fig. 6. The legs are yellowish, indistinctly ringed with gray on the femora. The hairs are long all over the body and the spines on the legs are also long. In the male the cephalothorax is wide behind and the legs are longer and stouter. The tibiae of the front legs are thickly covered with dark brown hairs which stand out at right angles to the leg and make it appear thickened. The male palpi are thickened toward the end. The tibia is as wide as long and the patella is also short and thick. The palpal organ has a long thin process at the end which lies across the tarsus and makes it appear twisted. The front row of eyes is shorter than the second row and the eyes are small with the lateral not much larger than the middle. The eyes of the second row are large and about their diameter apart.

New Haven, Conn., common in open woods among dead leaves. Adult about June 1st.

Pirata Snd.

The front row of eyes nearly straight. The second eyes very large and not more than their diameter apart, usually nearer together. The hinder eyes are farther forward and wider apart than in *Lycosa*. The hinder spinnerets are twice as long as the front pair. The thorax is usually marked by a median light stripe, which spreads into three toward the eyes. The dark lateral areas are more or less broken by radiating light lines.

Pirata piraticus Clerck.

PLATE XLVIII, FIGURES 7, 7a, 7b, 7c, 7d.

Length of female, 7.5^{mm}; cephalothorax, 3.5^{mm} long, 2.5^{mm} wide.

Yellow; with black or gray markings. The cephalothorax has a light narrow line in the middle and one on each side a short distance from the edge. In the middle of the front of the abdomen is a black-edged stripe which tapers backward to a point or fine line beyond the middle. On the sides of this are light stripes which unite into a single middle line, behind and outside of these a row of dark marks which extend down the sides, becoming gradually narrower. The legs and the under side of the body are light yellow. The mandibles are brown and the eyes are surrounded by black. The front row of eyes is of the same length as the second row, and the four eyes are nearly of the same size. The second row of eyes are large and about their diameter apart.

The epigynum has a small triangular opening behind, within which two round holes are visible; in front of the opening is a round swelling over the epigynum.

The males are a little smaller and brighter than the females.

The middle process of the palpal organ is large, wide at the base and ends in front in a sharp hook.

Salem, Massachusetts; New Haven, Conn.; in wet fields and under leaves in winter.

Pirata insularis, new.

PLATE XLVIII, FIGURES 8, 8a.

Length of female, 8^{mm}; cephalothorax, 3.3^{mm} long; 4th leg, 13^{mm}.

Colors dirty white and gray, somewhat like *Tegenaria medicinalis*. In the middle of the cephalothorax is a light line from the eyes to the dorsal groove. Two light lines extend from the hind eyes backward and unite into one behind the dorsal groove. At the sides are two other light lines. The abdomen has a light middle stripe on the

front half and the rest is nearly black with scattered small white spots. The femora are marked with three or four light and dark rings, and rings show indistinctly on the other joints in some specimens.

The sternum is dark with three indistinct light lines. The abdomen is dark beneath with many small light spots in oblique rows.

The epigynum is dark brown; divided at the edge into two lobes.

Long Lake, Adirondack Mountains, N. Y.

Pirata montanus, new.

PLATE XLVIII, FIGURE 9.

Length, 5^{mm}; 4th leg, 10^{mm}. The legs are yellowish white, with very faint grayish rings near the ends of the joints and dark spines. The sternum and coxæ are white. The cephalothorax is gray at the sides and has a wide light stripe in the middle, which is as wide as the head in front and tapers to half as wide behind. In the front half of this stripe are two dark lines, widest near the eyes and converging behind to the dorsal groove. The region around the eyes is black and the front of the head and mandibles dark. The sternum, front half of the abdomen and spinnerets are white.

The back of the abdomen is brown, with an indistinct row of small white spots each side. On the front end is a middle stripe with dark edges which tapers to a point near the middle of the abdomen. On the hinder segments are several dark and light transverse lines not forming any distinct figure.

The front row of eyes is considerably shorter than the second row, extending from the middle of one second eye to the middle of the other.

The hinder spinnerets are twice as long as the front pair and extend behind the abdomen.

The epigynum appears very simple externally, the spermathecae showing through the skin just in front of the edge of the fold in which appears to be the opening.

All the specimens are females, one from the White Mountains in July, with eggs, and two from Long Lake in the Adirondack Mountains, N. Y.

Pirata minutus, new.

PLATE XLVIII, FIGURES 10, 10a, 10b, 10c.

Length of male, 3^{mm}. Cephalothorax gray, with a light line near the edge of the thorax and several radiating lines. Legs white or light yellow. The femora of the front legs darker and the rest of the leg

lighter than the others. The abdomen is gray, marked by bright white spots. In the middle of the hinder half is a row of short transverse white lines, and at the sides of these two rows of white dots. At the sides of the front of the abdomen are several oblique white lines. The upper spinnerets are twice as long as the lower. The upper eyes are large and prominent and surrounded by black.

The male palpi are light colored and not much thickened. The palpal organ has small appendages which are all near the outer end of the tarsus. The middle process is a large hook with a smaller and shorter one turned in the opposite direction at its base.

Salem and Roxbury, Mass.; Meriden, Conn.

Pardosa C. Koch, Simon.

Lycosa Thorell = *Lycosa* Keyserling, Americanische Citigrade, zool.-botan. Ges., Wien, 1876.

PLATE XLIX, FIGURES 1, 1a, 1b, 1c, 1d.

Head high and the second eyes large and as far apart as their diameter, or farther. The front row of eyes is straight or a little curved upward and shorter than the second row. The dorsal eyes are a little farther apart and nearly as far from the second eyes as from each other. The mandibles are small and weak compared with those of *Lycosa*. The legs are long and slender, less hairy than in *Lycosa*, but with very long spines, which lie flat against the skin when at rest and are turned out when the spider is active. The spinnerets are short and the posterior pair are a little the longest. The species are all small and brightly marked and live among grass, especially in open, wet ground, making no nests.

Pardosa lapidicina, new.

PLATE XLVIII, FIGURES 5, 5a, 5b, 5c.

8^{mm} long. Cephalothorax, 3.5^{mm} long; 1st leg, 11^{mm}; 4th leg, 14^{mm}.

The general color is black or dark gray, covered with long hairs. The markings show plainer when wet with alcohol. The cephalothorax has an irregular light patch around the dorsal groove and small light spots around the edges. The legs are marked with light and dark rings, the width of the light rings increasing and the dark decreasing toward the tips. The back of the abdomen is marked with irregular rows of light spots, somewhat as in *L. cinerea*. The under side has some irregular light spots, sometimes a light spot in the middle with a black ring around it. Others have the whole abdomen black.

The palpal organs resemble those of *L. cinerea*. The epigynum is small with a single pit in front.

This species lives among stones in the driest places, and runs with great speed.

Salem, Mass. ; Meriden, Conn.

Pardosa brunnea, new.

PLATE XLVIII, FIGURES 4, 4a, 4b.

Length of ♀, 8.5^{mm}. Cephalothorax, 4^{mm} long, 3.3^{mm} wide.

Colors dark brown with light markings. The head between the eyes is very dark, almost black. The middle of the cephalothorax is light, except a dark line which extends back as far as the dorsal groove. There is a narrow light stripe on each side a short distance from the edge. The legs are dark brown with some irregular longitudinal light stripes, and lighter toward the ends, especially in males. The abdomen is dark brown, except a light pointed marking over the dorsal vessel and a row of irregular black spots each side. The sternum is brown, with sometimes an indistinct light line in the middle and on the edges. The under side of the abdomen has a light stripe in the middle, from the epigynum to the spinnerets. The sides are brown in irregular spots. The male palpus is short and stout. The tibia is a little thickened and covered with long hairs that make it look still thicker. The tarsus is nearly as wide as long, and the palpal organ is large and black. Fig. 4a. The epigynum has a peculiar shape, fig. 4b, and varies somewhat in different individuals in the shape of the middle lobe.

Mt. Washington; Dublin, N. H.; Eastern Massachusetts; New Haven, Conn.

Pardosa albomaculata, new.

PLATE XLVIII, FIGURES 3, 3a, 3b.

Female, 11^{mm} long. Cephalothorax, 5^{mm} long, 4^{mm} wide; 1st leg, 15^{mm}; 4th leg, 20^{mm}.

Color deep black, with spots of white hairs. On the abdomen are two rows of distinct spots, and there are less definite ones on the legs and around the thorax. The whole body is covered with long hairs, and only when these are wet are the markings on the skin visible. There are light rings on the legs and indistinct light spots on the thorax as in the related species.

The middle ridge of the epigynum is narrow, only slightly widened

at the end. At the sides are prominent ridges over the openings. Fig. 3a.

The male palpi are large and stout. The tibial joint is as wide as long. The tarsal joint is short and wide. The palpal organ is large and complicated and very different from that of the nearest species.

Bare rocks on the upper part of the White Mountains, running very rapidly and dodging under stones at slight alarm.

Pardosa pallida, new.

PLATE XLIX, FIGURES 3, 3a, 3b, 3c, 3d, 3e.

Length, 5^{mm}; 1st leg, 6^{mm}; 4th leg, 10^{mm}.

The general color is light yellow with brown markings. The cephalothorax is yellow with two brown stripes, which unite and become black between the middle eyes. There is a fine black line near the edge of the thorax on each side. The abdomen has a light middle band not much widened in front, where it includes a light stripe with dark brown edges, which tapers to a point about the middle of the abdomen. The hinder part of the middle stripe is indistinctly divided into four or five segments. At the sides of the middle stripe the abdomen is dark brown or black in small irregular spots and becomes gradually lighter toward the sides. The sternum is light, with a black line or row of spots around each side and two similar lines near the middle uniting into one behind. On the under side of the abdomen are two black lines from the spiracles to the spinnerets. The legs are light yellow, with a few irregular black streaks, especially on the inner joints.

The ends of the male palpi are black and the front legs and head are a little darker in the male than in the female, but otherwise there is not much difference between them. The shape of the epigynum is characteristic of this species. Fig. 3c. The middle process of the palpal organ is very long and wide and curved obliquely across the bulb. Fig. 3e.

New Hampshire; Massachusetts; New Haven, Conn.

Pardosa bilineata, new.

PLATE XLIX, FIGURES 4, 4a, 4b.

This species resembles closely *P. pallida*, but is much larger, the markings of the under side less distinct and the epigynum very different, being T-shaped and much shorter than in *pallida*.

The female is 7^{mm} long. The cephalothorax, 3.5^{mm}; 4th leg, 12^{mm}. The markings of the back are similar to those of *P. pallida*. The legs

are light yellow, a little brownish toward the end. The sternum is light with a dark edge and a row of dark spots on each side meeting behind. The under side of the abdomen is indistinctly marked with four longitudinal lines converging behind.

The epigynum is of the common T-shape, about as wide as long.
East Rock, New Haven, Conn.

Pardosa albopatella, new.

PLATE XLIX, FIGURES 2, 2a, 2b.

Male, 4^{mm} long. Cephalothorax, 2.5^{mm} long, 2^{mm} wide. The cephalothorax has a light stripe along each side covered in life with white hairs which extend to the edge of the thorax and make the stripe appear wider than in alcohol. In the middle of the thorax is a light spot which tapers behind to a point near the hinder end of the thorax and fades in front into the dark markings of the head. The rest of the cephalothorax is black, blackest toward the front. The male palpi are black, except the patellæ, which are bright white. The legs are light at the ends with white and gray hairs and black spines. The femora are darker, the hinder ones ringed with gray, and the front pair entirely black. The abdomen is gray with an indistinct light stripe in the middle of the front part, extending back only half the length of the abdomen. The sternum is black. The under side of the abdomen is gray with a black line in the middle and on each side.

The middle process of the palpal organ is long and curves obliquely across the bulb its whole width. The tarsus of the palpus is long and slender. Fig. 2b.

In the female the light markings are smaller and less distinct than in *nigropalpis*.

Ipswich and Roxbury, Mass. New Haven, Conn. May and June.

Pardosa nigropalpis, new.

PLATE XLIX, FIGURES 1, 1a, 1b, 1c, 1d.

Males, 5^{mm}; females, 6^{mm} long; 4th leg of female, 12^{mm}.

Cephalothorax of male black with a light band in the middle from the posterior eyes to the abdomen. This band widens just behind the eyes and suddenly narrows again about the middle of the cephalothorax. It widens again around the dorsal groove and narrows behind. Around the edge of the thorax are narrow light stripes or rows of irregular spots.

A light band about as wide as that on the thorax continues back-

ward along the middle of the abdomen. It widens in front and tapers backward nearly to the middle, behind which it is broken up into a series of four or five transverse spots edged with deep black and including some fine black spots. Legs yellowish, ringed with gray on the femur and less distinctly on the patella and tibia. In a fresh young female the general color is gray. The gray band on the cephalothorax extends forward covering the area between the eyes to the front of the head. This part of the band is a little darker than the rest. The edges of the cephalothorax are a little lighter than the rest but the light markings only show when wet. The legs are plainly ringed with gray on all the joints and the palpi are light.

The sternum is black in the middle and light at the sides. The coxæ are light and the under side of the legs lighter than the upper. The under side of the abdomen is sometimes entirely gray, or there is a middle lighter area with a dark stripe running back from the epigynum nearly to the spinnerets. The male palpi are black at the end and the other joints are darkened by scattered black hairs.

The middle process of the male palpi is short and sharply bent toward the side and the small hook at its base is very small. Fig. 1c.

Massachusetts and Connecticut.

Pardosa montana, new.

PLATE XLIX, FIGURES 5, 5a.

♀, 6^{mm} long; ♂, 5^{mm}. In alcohol, at least, the colors are duller and the markings less distinct than in the other species in both sexes. The legs are more distinctly ringed on the femur and tibia, all the legs nearly alike. The light markings on the middle of the thorax and abdomen are large like *P. albopatella*, but not brightly colored. There is little difference in the markings between the sexes. The epigynum is wide with a small narrow middle lobe. The anterior pits are large and wide apart. The male palpi are long and the joints are not much thickened. The middle process of the palpal organ is short and stout, with the end curved backward into a short hook. Fig. 5.

Mt. Washington, N. H., June. Mt. Tom, Mass., April 4, 1878.

Aulonia C. Koch.

The head is high and wide. The middle and posterior eyes are very large, and seen from above form almost a square covering the whole top of the head. The front row of eyes is much shorter than the second row and slightly curved upward. The second row are

less than their diameter apart. The posterior eyes are turned outward and backward. The hinder spinnerets are about twice as long as the front pair, but when folded together are not conspicuous. The species are small and slender, as in *Pardosa*.

Aulonia aurantiaca, new.

PLATE XLIX, FIGURES 6, 6a, 6b.

Female, 3^{mm} long; 4th leg, 5^{mm}. Male a little smaller. The abdomen is brownish orange-color with a yellow spot in the middle tapering to a row of smaller spots behind. The cephalothorax has a yellow spot behind, just under the front end of the abdomen, and a narrow bright yellow stripe on each side. The middle is yellowish without any definite stripe or spots. The rest of the cephalothorax is black. The legs of the female vary from dark brown on the front pair to light yellow on the hinder pair. In the male the legs are whiter with the femora of the first and second pairs black, or partly spotted with black. The male palpi are black, except the tips, which are partly white. The white parts turn yellowish in alcohol.

The front eyes are smaller and the whole row not much more than half as wide as the second row; it is slightly curved upward and the middle eyes are a little larger than the lateral.

The palpal organ is large and the tarsus wide and short. In the middle is a long appendage, thick and rounded at the front end and sharply pointed behind. Fig. 6a.

Eastern Massachusetts; New Haven, Conn.

Ocyale Aud., in Sav.

The cephalothorax is a little more elongated than in *Dolomedes*, and the head more distinctly separated by grooves. The eyes differ but little in size, and the hinder pair are not much farther back than the second.

Ocyale undata.

Micrommata undata, serrata and *carolinensis* Hentz, Boston Journal of Nat. Hist., vol. v.

PLATE XLIX, FIGURES 7, 7a.

This species resembles *Ocyale mirabilis* of Europe, but the body is less narrowed behind and the eyes are more like *Dolomedes*.

The female is 13^{mm} long. Cephalothorax, 5^{mm} long, 5^{mm} wide; 1st, 2d, and 4th legs, 25^{mm} long.

The cephalothorax and abdomen are flat and the cephalothorax is as wide behind as it is long. In old females the legs are reddish

brown without any rings or other markings. In the middle of the cephalothorax is a longitudinal stripe about a third its width, of the same color as the legs. The sides of the cephalothorax are light yellow, darkest toward the edges. The brown middle stripe continues along the abdomen with the edges a little irregular but with no distinct teeth or undulations. Young individuals have all the colors lighter and yellower, the legs more or less ringed and the middle stripe of the abdomen distinctly undulated. Along the edges of the middle stripe there is usually a fine white line which is sometimes broken up into a row of spots, as in Hentz's *M. carolinensis*. In very young spiders the abdominal stripe is distinctly serrated, as in Hentz's *M. serrata*, the stripe on the thorax divided into two and the whole body less flattened.

The male palpi are long. The tarsus is pointed but nearly as wide as long. The middle process of the palpal organ is flat and thin, spreading out over the greater part of the bulb. At one side it is narrowed into a fine point which supports the end of the long slender tube, the ends of both resting on a short process at the base of the bulb. On the under side of the end of the tibia is a wide flat process extending up to the palpal organ, and on the outer side is a long tooth slightly notched at the end.

From July to September the females may be found under large bunches of web four or five inches across, in grass or low bushes in meadows. The cocoon is placed in this bunch of web, and the young after hatching scatter themselves through it.

Eastern Massachusetts; New Haven, Conn.

Dolomedes.

In this genus the cephalothorax is about as wide as long, and rounded on the back, with but little separation between the head and thorax. The head is wide and nearly straight in front. The front row of eyes is composed of four small ones as in *Lycosa*. The second row are larger, but not larger than those of the third row, which are twice as far apart and a little farther back. The legs are long, and the first, second and fourth, are nearly equal in length. The feet are thickly covered with fine hairs. The abdomen is a little flattened and a little pointed behind. The tibia of the male palpus has a large process on one side. They live near water on which they run easily. The female carries the cocoon in her mandibles until the young are ready to hatch, and then fastens it in a bush with many irregular threads, among which the young remain a short time after leaving the cocoon.

Dolomedes sexpunctatus Hentz, Boston Journal of Nat. Hist., vol. iv.

PLATE XLIX, FIGURES 8, 8a.

Female, 13^{mm} long. Cephalothorax, 5·5^{mm} long, 5^{mm} wide. The cephalothorax is not as wide in proportion to its length as in the other species. The color is dark olive or gray and yellow. The cephalothorax is dark yellowish brown with a very bright white line on each side extending forward to the front of the mandibles. The abdomen is dark gray, darkest in the middle, with two rows of small white spots. The legs and palpi are greenish yellow with dark spines. The under side is lighter yellow. On the sternum are six black spots, sometimes very distinct, in other individuals hardly visible.

This species lives near water, on which it runs easily. Eastern Massachusetts; Albany, N. Y.; New Haven, Conn. Though it is common, I have only found one adult female and no males.

Dolomedes tenebrosus Hentz.

PLATE XLIX, FIGURES 9, 9a, 9b, 9c.

Length of female, 18^{mm}; 1st leg, 33^{mm}; 4th leg, 37^{mm}; cephalothorax, 9^{mm} long, 8^{mm} wide.

Male, 16^{mm} long; cephalothorax, 9^{mm} long, 8^{mm} wide; 1st leg, 44^{mm}; 4th leg, 48^{mm}.

This is one of our largest spiders, some males spreading four inches. The colors are dark brown and light gray, turning darker and yellower in alcohol. The cephalothorax has a light stripe on each side. The abdomen is marked with five or six dark brown angular stripes across the hinder half. These are darkest around the edges and bordered by lighter lines. The legs are marked with dark and light rings, which are plainer in the male than female. The markings on the abdomen are also somewhat different in the male, being more united into a middle band bordered by lateral bright white or yellow ones. The femora of the fourth pair have near the end on the under side an oblique cluster of black spines on a slight elevation. The male palpi have the tibia widened at the end, and a large process on the outer side near the middle, consisting of a large hook with a smaller one at its base and above it. The tarsus is large and the palpal organ complicated with a long slender tube.

These spiders live on bushes near water. The female makes a large mass of web in which she places the cocoon of eggs, and in which the young live for some time after hatching.

Massachusetts. New Haven, Conn.

Dolomedes fontanus, new.

PLATE XLIX, FIGURE 10.

This spider resembles closely *D. tenebrosus*, but is a little smaller. Length, 14^{mm}; longest leg, 36^{mm}. There are no tufts of bristles on the hind femora. The male palpi are much like those of *tenebrosus*, but the process on the tibia has two small hooks of nearly equal length. The abdominal markings and the indistinct rings on the legs are like those of the male *tenebrosus*.

One male. Dublin, N. H., near water.

Oxyopes Latr.

This genus is often placed in a separate family from the Lycosidae, on account of the great difference in the arrangement of the eyes caused by the lateral eyes of the front row being placed wide apart at the sides of the head and above the eyes of the second row. This places the eyes in four rows, the first of two small eyes near together, the second of two large eyes as in *Lycosa*, the third of two small eyes wide apart, and the fourth of two small eyes on the top of the head. The head is very high and wide on the lower edge. The abdomen is wide and pointed behind. The legs are very slender and tapering and have long spines.

Oxyopes scalaris Hentz, Boston Journal Nat. History, vol. v.

PLATE XLIX, FIGURES 11, 11a.

6^{mm} long; cephalothorax, 2.5^{mm}.

The cephalothorax is wide in front and as high as wide, the head narrowing a little upward toward the eyes. The abdomen is wide in the middle and pointed behind. The general color in alcohol is dark brown covered with gray and yellow hairs. The middle of the cephalothorax is light with irregular edges. The abdomen has a row of light spots in the middle and a less distinct row each side. The under side of the abdomen has a dark stripe in the middle, on each side of which is a bright yellow stripe. The legs are slender and tapering, with very long spines. They are marked with dark rings or spots at the end and middle of each joint.

The eyes are in four rows. The lower row consists of two very small eyes, about half way between the mandibles and the top of the head; the next, of two larger eyes, the largest of all, about their diameter apart; the third, of two small eyes twice as far apart as the second; and the fourth, of two eyes a little smaller than the second and a little farther apart, on the top of the head.

The mandibles are small and tapering and shorter than the height of the head. Nashua, N. H., running on a fence.

EXPLANATION OF PLATES.

PLATE XLVI.

- Figure 1.—*Lycosa nidicola*. Female.
Figure 1a.—The same. Male.
Figure 1b.—The same. Under side of abdomen of female.
Figure 1c.—The same. Palpus of male.
Figure 1d.—The same. Epigynum.
Figure 2.—*Lycosa polita*. Female, common variety of marking.
Figure 2a.—The same. Female, variety with brighter markings.
Figure 2b.—The same. Eyes.
Figure 2c.—The same. Epigynum.
Figure 3.—*Lycosa frondicola*. Female.
Figure 3a.—The same. Female, under side of abdomen.
Figure 3b.—The same. Epigynum.
Figure 4.—*Lycosa pratensis*. Female.
Figure 4a.—The same. Epigynum.
Figure 4b.—The same. Male palpus.
Figure 5.—*Lycosa pictilis*. Female.
Figure 5a.—The same. Male palpus.*
Figure 5b.—The same. Epigynum.
Figure 6.—*Lycosa kochii*. Female.
Figure 6a.—The same. Epigynum.
Figure 6b.—The same. Male palpus.
Figure 6c.—The same. Maxillæ of female.

PLATE XLVII.

- Figure 1.—*Lycosa carolinensis*, under side of female.
Figure 1a.—The same. Epigynum.
Figure 1b.—The same. Male palpus.
Figure 2.—*Lycosa vulpina*. Epigynum.
Figure 3.—*Lycosa cinerea*. Female.
Figure 3a.—The same. Male palpus.
Figure 3b.—The same. Eyes.
Figure 4.—*Lycosa nidifex*. Female.
Figure 4a.—The same. Epigynum.
Figure 4b.—The same. Male palpus.
Figure 5.—*Lycosa nigroventris*. Female.
Figure 5a.—The same. Female, under side.
Figure 5b.—The same. Male palpus.

- Figure 6.—*Lycosa communis*. Female.
 Figure 6a.—The same. Under side of female.
 Figure 6b.—The same. Another variety of dorsal marking.
 Figure 6c.—The same. Epigynum.
 Figure 6d.—The same. Male palpus.

PLATE XLVIII.

- Figure 1.—*Lycosa punctulata*. Female; $\times 4$.
 Figure 1a.—The same. Under side of abdomen.
 Figure 1b.—The same. Epigynum.
 Figure 2.—*Lycosa scutulata*. Female.
 Figure 2a.—The same. Epigynum.
 Figure 3.—*Pardosa albomaculata*. Female from alcohol.
 Figure 3a.—The same. Epigynum.
 Figure 3b.—The same. Male palpus.
 Figure 4.—*Pardosa brunnea*. Female; $\times 4$.
 Figure 4a.—The same. Male palpus.
 Figure 4b.—The same. Epigynum.
 Figure 5.—*Pardosa lapidicina*. Female; $\times 4$, from one in alcohol.
 Figure 5a, 5b.—The same. Male palpus.
 Figure 5c.—The same. Epigynum.
 Figure 6.—*Lycosa ocreata*. Male; $\times 4$.
 Figure 6a.—The same. Front of head and eyes.
 Figure 6b.—The same. Male palpus.
 Figure 7.—*Pirata piraticus*. Female; $\times 4$.
 Figure 7a.—The same. Eyes.
 Figure 7b.—The same. Epigynum.
 Figure 7c, 7d.—The same. Male palpus.
 Figure 8.—*Pirata insularis*. Female; $\times 8$.
 Figure 8a.—The same. Epigynum.
 Figure 9.—*Pirata montanus*. Female; $\times 8$.
 Figure 10.—*Pirata minutus*. Front of head and eyes of female.
 Figure 10a.—The same. Male palpus.
 Figure 10b, 10c.—The same. Spinnerets.

PLATE XLIX.

- Figure 1.—*Pardosa nigropalpis*. Female; $\times 8$.
 Figure 1a.—The same. Male; $\times 8$.
 Figure 1b, 1c.—The same. Male palpus.
 Figure 1d.—The same. Epigynum.
 Figure 2.—*Pardosa albopallida*. Female; $\times 8$.
 Figure 2a.—The same. Male; $\times 8$.
 Figure 2b.—The same. Male palpus.
 Figure 3.—*Pardosa pallida*. Female; $\times 8$.
 Figure 3a.—The same. Male; $\times 8$.
 Figure 3b.—The same. Under side of female.
 Figure 3c.—The same. Epigynum.

- Figure 3*d*.—The same. Top of head and eyes.
Figure 3*e*.—The same. Male palpus.
Figure 4.—*Pardosa bilineata*. Female.
Figure 4*a*.—The same. Under side.
Figure 4*b*.—The same. Epigynum.
Figure 5.—*Pardosa montana*. Male palpus.
Figure 5*a*.—The same. Epigynum.
Figure 6.—*Aulonia aurantiaca*. Cephalothorax of female ; $\times 20$.
Figure 6*a*.—The same. Male palpus.
Figure 6*b*.—The same. Epigynum.
Figure 7.—*Ocyale undata*. Back of female ; $\times 4$.
Figure 7*a*.—The same. Male palpus.
Figure 8.—*Dolomedes sexpunctatus*. Female.
Figure 8*a*.—The same. Under side of thorax.
Figure 9.—*Dolomedes tenebrosus*. Dorsal markings of young.
Figure 9*a*, 9*b*.—The same. Male palpus.
Figure 9*c*.—The same. Epigynum.
Figure 10.—*Dolomedes fontanus*. Male palpus.
Figure 11.—*Oxyopes scalaris*. Female ; $\times 8$.
Figure 11*a*.—The same. Front of head, eyes and mandibles.